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(51) INT CL<sup>4</sup>

F16B 2/08

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None

(58) Field of search

E2A

Selected US specifications from IPC sub-classes F16B B64D

## (54) Plastics clamping strap device

(57) A plastics clamping strap device for embracing and holding cables, pipes and bunches of cables has an integral fixing portion (2) for press attachment to a connector pin, such as a screwthreaded pin or bolt, and a clamping strap portion (1) formed at the lower end of the fixing portion (2). The strap portion (1) is provided with uniformly spaced transverse portions (5) arranged transverse to the direction of the strap portion having a hook-like cross-section and which are engageable with a latching hook (7) also formed on the fixing portion (2).

The transverse portions (5) are provided with retaining edges (6) which face towards the fixing portion (2) and which project above the strap portion (1) by an amount corresponding to the head height 'k' of the latching hook (7) so that the retaining edge (8) of the latching hook (7) can be pushed under the retaining edge (6) in the engagement operation. In addition the open gap 'd' between the retaining edge (6) of a transverse portion (5) and the rear wall (9) of the next following transverse portion (5) is somewhat smaller than the width 'b' of the head of the latching hook so that although the latter may be pressed into the passage 'd' by the application of a light force, it cannot be released again of its own accord after engagement of the hook (7) in to the retaining edge (6).

FIG. 1

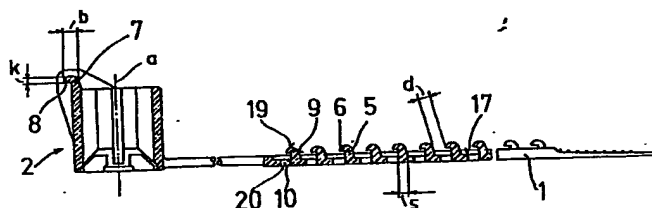


FIG. 5

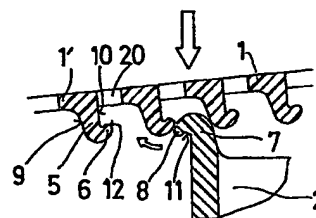
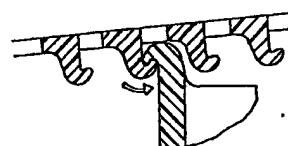


FIG. 6



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FIG. 1

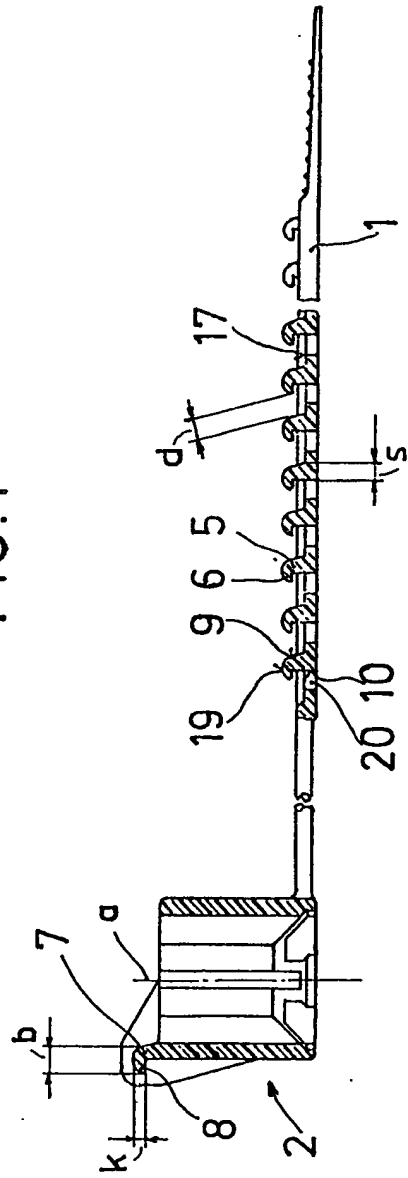


FIG. 2

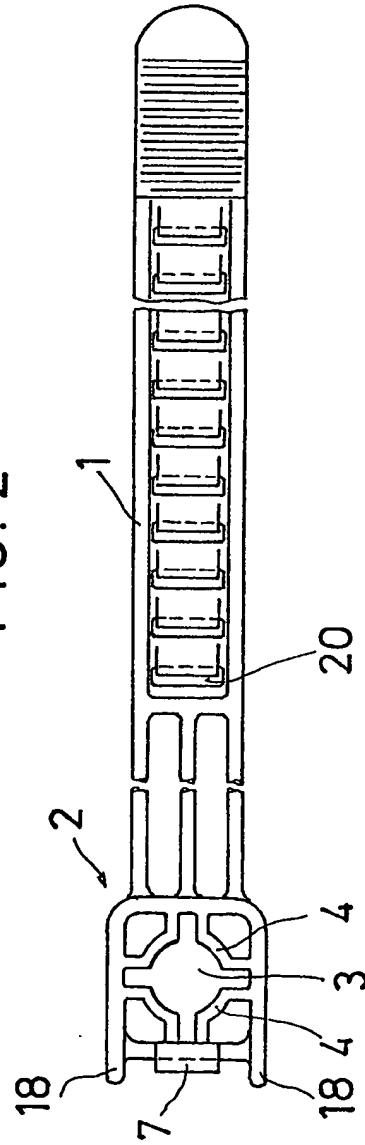


FIG. 3

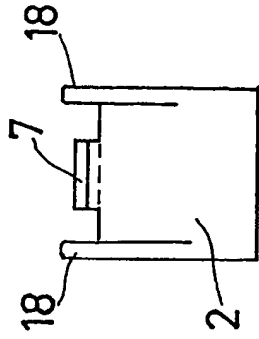


FIG. 4

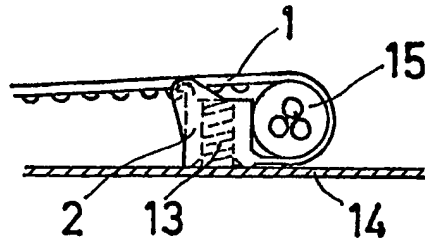


FIG. 5

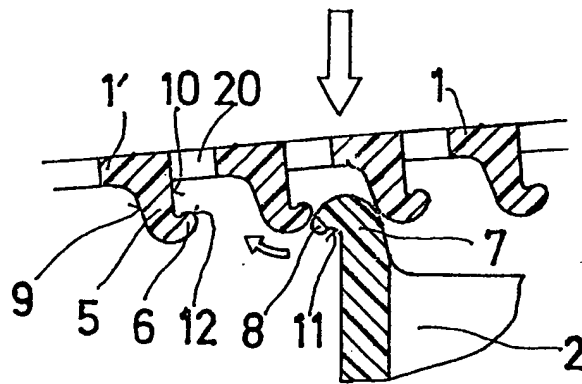


FIG. 6

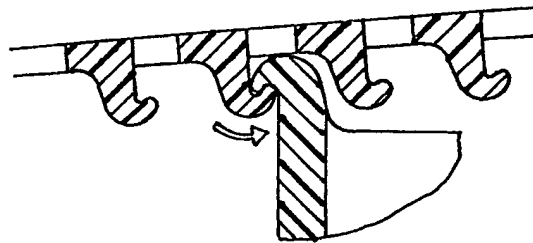


FIG. 7

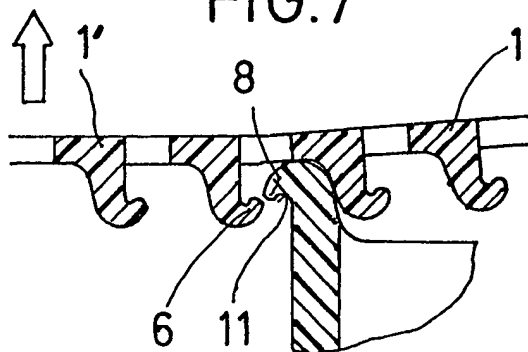


FIG. 8

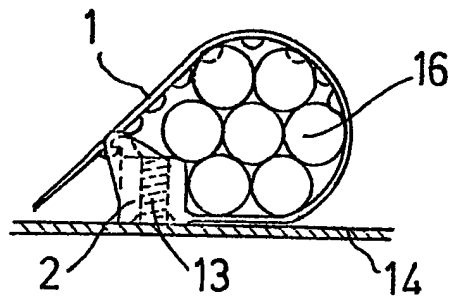
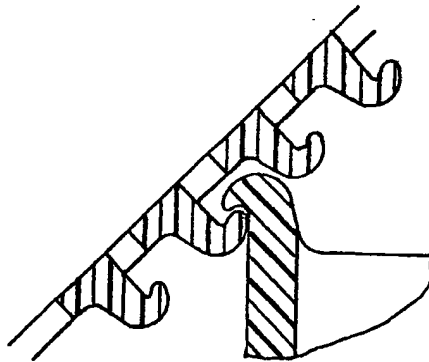


FIG. 9



## SPECIFICATION

## Plastics clamping strap device

- 5 This invention relates to a plastics clamping strap device for embracing and holding one or more cables or pipes. Such a device usually has a fixing portion mounting on a screwthreaded pin or bolt and a clamping strap portion for wrapping around one or
- 10 more cables or pipes. The clamping strap portion usually is attached to the fixing portion at one end thereof and has retaining elements spaced therealong transverse to the strap direction for engagement with a latching hook on the fixing
- 15 portion.
- In known clamping straps of this kind, the retaining elements are often in the form of transverse bars which are connected together by limb portions either at the centre (German laid-open
- 20 application (DE-OS) No 31 43 775) or at the ends (German laid-open application (DE-OS) No 28 47 505) and which are hooked into what is referred to as holding claws. The clamping strap which is formed from transverse bars and web portions is tensioned
- 25 after having been passed around the cable or bunch, until a transverse bar can just be pressed past the tip of a claw, by means of the thumb, and, with a slight release of the clamping force, can be hooked into the groove in the claw. If the clamping strap is to be
- 30 released again, it firstly has to be retightened until the bar can be lifted out of the groove in the claw, over the tip thereof. This additional tightening operation when engaging the bar with the holding claw and when releasing the strap is found to be a
- 35 disadvantage because it involves the application of an additional force. Furthermore, it is difficult to grip the end of the strap closely behind the holding claw, between a thumb and an index finger, and then pull it or press it towards the carrier plate.
- 40 There is thus a need for a generally improved clamping strap device with improved retaining and locking elements such that the operations of engaging the strap portion in the holding position and also releasing the strap are substantially
- 45 improved.
- According to the present invention there is provided a plastics clamping strap device for embracing and holding one or more cables or pipes, including a fixing portion for attachment, by
- 50 pressing, to a connector pin, and a clamping strap portion, for wrapping around one or more cables or pipes, formed with and on the fixing portion at an end thereof which is lowermost in use, which clamping strap portion is provided with retaining
- 55 elements uniformly spaced therealong transverse to the direction of the strap portion for engagement into a latching hook formed on the fixing portion, wherein the retaining elements are transverse portions of hook-shaped cross-section, with retaining edges which face towards the fixing
- 60 portion, when the strap portion is not attached around one or more cables or pipes, and which project proud of the strap portion by an amount corresponding to the height (k) of a head of the
- 65 latching hook, and wherein the open gap 'd' between

- th retaining edge of a transverse portion and a rear wall of the adjacent transverse portion is less than the width 'b' of the head of the latching hook. The retaining elements in the device of the invention
- 70 have the great advantage over known retaining bars that, when the clamping strap portion is being put into the engaged condition with the latching hook after having been firmly wrapped around the cable or bunch of cables, the latching hook can be pressed
- 75 virtually like a wedge portion into the open gap between two adjacent transverse portions, while the respective retaining edge is first passed away somewhat from the oppositely disposed rear wall and, after passing the retaining edge of the latching
- 80 hook, springs back into the original position and in so doing securely engages under the retaining edge of the latching hook.

The operation of releasing the clamping strap portion is also substantially easier than when

85 dealing with the known straps with retaining bars. For this purpose, it is sufficient simply to pull the free end of the strap portion upwardly. As a result, the engaged transverse portion is bent away from the latching hook and the open gap is increased in size

90 until the two retaining edges can slide past against each other.

Preferably head edges of the transverse portions have a rounded configuration. This ensures that the head of the latching hook, which is also rounded, can

95 be introduced into the open gap between two adjacent transverse portions, in a particularly simple manner.

Conveniently the rear walls of the transverse portions incline towards the strap portion and the width 's' of the each transverse portion increases towards the strap portion. This ensures a good level of stability for the transverse portions.

Advantageously the latching hook has a retaining groove while the transverse portions have

105 correspondingly rounded retaining surfaces to engage, one at a time, fully in the retaining groove. This arrangement ensures that, in all inclined positions of the strap that can occur, the retaining edges of the transverse portions engage over a full

110 area into the retaining groove of the latching hook.

For a better understanding of the present invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

115 *Figure 1* is a longitudinal sectional side view of a clamping strap device according to the invention, with integrated fixing portion for screwthreaded pins or bolts,

*Figure 2* is a plan view of the device of *Figure 1*, *Figure 3* is a front view of the fixing portion of the device of *Figures 1* and *2*,

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*Figure 4* shows a device of *Figures 1* to *3* mounted on a screwthreaded pin or bolt, with the embracing strap portion in an engaged condition, with the

125 smallest possible embracing diameter,

*Figure 5* is a longitudinal sectional view, to an enlarged scale, of a portion of the strap portion of *Figures 1* to *4*, when it is being pressed on to a latching hook,

130 *Figure 6* shows the same portion of *Figure 5* after

engagement of a retaining edge,

Figure 7 shows the same portion of Figure 5 when releasing the strap portion,

Figure 8 shows a mounted clamping strap device as in Figure 4, but with the largest possible embracing diameter, and

Figure 9 is a longitudinal sectional view to an enlarged scale of a portion of the strap portion after engagement of the retaining edge with the latching hook.

The clamping strap device of the invention is made from hard-elastics plastics material and basically comprises an embracing strap portion 1 for holding cables, pipes and/or bunches of cables with different embracing diameters, and a fixing portion 2 for attachment, by pressing, to a connector pin, preferably to a screwthreaded pin or bolt 13 which is welded or anchored in some other manner on a carrier plate or panel 14 (see Figures 4 and 7).

To this end the fixing portion 2 is provided with a mounting hole 3 which in the illustrated embodiment is formed by arcuate clamping walls 4 which are resiliently connected together. It will be appreciated that other suitable clamping means for screwthreaded pins or bolts may be used for the mounting hole 3.

The strap portion 1 is formed or moulded on the fixing portion 2 at the lower end thereof, more particularly perpendicularly to the axis 'a' of the mounting hole 3 so that, after the fixing portion 2 has been fitted on to the screwthreaded pin or bolt 13, the strap portion 1 projects parallel to the carrier plate or panel 14. Disposed on the strap portion 1 at uniform spacings therealong are transverse portions 5 which are of a hook-like cross-section, with retaining edges 6 which face towards the fixing portion 2. Provided at the upper oppositely disposed end of the fixing portion 2 is a latching hook 7 which is rounded off upwardly, matches the retaining edges and has a retaining edge 8 facing away from the fixing portion 2. The retaining edges 6 of the transverse portions 5 can be engaged with the retaining edge 8 after the strap portion has been passed around a cable 15 or a bunch of cables 16 (see Figures 4 and 7).

The retaining edges 6 project above the top side 17 of the strap portion 1 to such an extent that the retaining edge 8 of the latching hook 7 can be pushed under the retaining edge 6, in the engaging operation. In addition, the open gap 'd' between the retaining edge 6 of a transverse portion 5 and the rear wall 9 of the next following transverse portion 5 is desirably somewhat smaller than the width 'b' of the head of the latching hook 7 so that although the latching hook 7 can be pressed into the passage 'd' by the application of a light force, it cannot come open again of its own accord after engagement of the hook 7 with the retaining edge 6.

For the purposes of making it easier to insert the rounded latching hook 7 into the open gap 'd' between the retaining edge 6 of the transverse portion 5 which is to be used for the engagement action, and the oppositely disposed rear wall 9, the transverse portions 5 have rounded head edges 19, the curved surface of which runs downwardly to the

retaining edge 6 on one side and runs into the rear wall 9 on the other side. In order to impart the necessary stability and strength to the transverse portion 5, the rear walls 9 which face away from the fixing portion 2 incline towards the strap portion 1 preferably being inclined at an angle of 70° to 80° so that the width 's' of the portions increases from the head edge 19 towards the strap portion 1. It will be appreciated that the front wall 10 which is under the retaining edge 6 is perpendicular to the top side 17 of the strap portion, for reasons concerned with the procedure for removing the component from a mould, and that the strap portion 1 has a moulding-removal hole 20 perpendicularly below the retaining edge 6, corresponding to the length and width thereof.

As will be seen from Figure 5, the latching hook 7 preferably is provided with a retaining groove or channel 11 while the transverse portions 5 have correspondingly rounded retaining surfaces 12 which lie fully in the retaining groove 11 in all inclined positions of the strap portion 1 that may occur (see Figures 6 and 9). This ensures optimum engagement of the clamping strap portion 1.

In order to ensure lateral guidance for the engaged clamping strap portion 1, guide lugs 18 are formed or moulded on the fixing portion 2, on both sides of the latching hook 7.

The mode of operation of the device for various diameters to be embraced is shown in Figures 4 to 9.

Figure 4 shows a clamping strap device which is mounted on a screwthreaded pin or bolt 13, with the embracing strap portion 1 in the engaged condition, extending around and holding a single thin cable 15. In this arrangement, the strap portion 1 firstly is laid around the cable 15 and pulled taut and then, as shown in Figure 5, pressed down in the direction indicated by the arrow so that the latching hook 7 penetrates with a wedgelike action between two adjacent transverse portions 5 and bends the transverse portion 5 which is at the left in the drawing, somewhat towards the side, in the direction indicated by the small arrow. As soon as the retaining edge 8 of the hook 7 has passed beyond the constricted region between the retaining edge 6 and the rear wall 9, the left-hand transverse portion 5 springs back into its normal position.

In this case, the rounded retaining surface 12 snaps fully into the retaining groove 11 of the latching hook 7, thereby ensuring an absolutely secure latching action (see Figure 6).

If the strap portion 1 is to be released again, this is done in a simple manner by lifting the loose end 1' of the strap portion in the direction indicated by the arrow in Figure 7. When this is done, the retaining edge 6 of the transverse portion 5 is pulled out of the retaining groove 11 until the above-mentioned edge 6 passes the retaining edge 8 of the hook 7. This retaining principle excludes automatic release or release due to an external force acting on the cable strap portion 1 extending around the cable.

Figure 8 shows a mounted clamping strap as in Figure 4, which however extends around and holds a bunch of cables 16, of the largest possible diameter. In this case, the strap portion 1 meets the latching hook

7 at a severely inclined angle. By virtue of the rounded retaining surfaces 12 and the correspondingly curved retaining groove 11 however, the arrangement ensures that the strap portion 1 is satisfactorily and positively locked in the latching hook 7, even in the inclined position referred to above, as can be seen from Figure 9. In order to release the strap portion 1, the end 1' of the strap portion is pulled in the same manner as in Figure 7.

#### 10 CLAIMS

1. A plastics clamping strap device for embracing and holding one or more cables or pipes, including a fixing portion for attachment, by pressing, to a connector pin, and a clamping strap portion, for wrapping around one or more cables or pipes, formed with and on the fixing portion at an end thereof which is lowermost in use, which clamping strap portion is provided with retaining uniformly spaced therealong transverse to the direction of the strap portion for engagement into a latching hook formed on the fixing portion, wherein the retaining elements are transverse portions of hook-shaped cross-section, with retaining edges which face towards the fixing portion, when the strap portion is not attached around one or more cables or pipes, and which project proud of the strap portion by an amount corresponding to the height (k) of a head of the latching hook, and wherein the open gap 'd' between the retaining edge of a transverse portion and a rear wall of the adjacent transverse portion is less than the width 'b' of the head of the latching hook.
2. A device according to claim 1, wherein the transverse portions have rounded head edges, each having a curved surface which is extended on one side towards and as far as the associated retaining edge and which runs into the associated rear wall on the other side.
3. A device according to claim 1 or claim 2, wherein the rear walls of the transverse portions, which rear walls face away from the fixing portion, incline towards the strap portion, and the width 's' of each transverse portion increases towards the strap portion.
4. A device according to any one of claims 1 to 3, wherein the latching hook has a retaining groove while the transverse portions have correspondingly rounded retaining surfaces which, when the strap portion is operatively wrapped around one or more cables or pipes, engage, one at a time fully in the retaining groove of the latching hook.
5. A plastics clamping strap device for embracing and holding one or more cables or pipes, substantially as hereinbefore described and as illustrated in the accompanying drawings.